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ABSTRACT

Developed by the ABCs of Construction National Workplace Literacy Project, these curriculum materials for the occupational area of pipefitter contain two lessons that deal with getting meaning from context. Each lesson consists of an objective, instruction, and exercises. Lesson 1 contains 11 exercises, and lesson 2 has 12. The objective of lesson 1 is for the student to be able to define unknown words by examining the familiar words that surround them; lesson 2's objective is to define words using clues in the sentence provided by the author. (YLB)

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ED 374 304

TECHNICAL DEVELOPMENT CENTER

Meaning from
Context

PIPEFITTER

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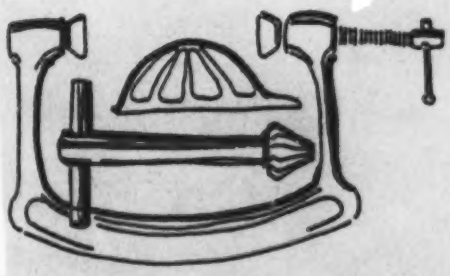

Associated Builders & Contractors, Inc.
EBR Adult & Continuing Education

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ABC's of Construction

National Demonstration Project in Workforce Literacy

The ABC's of Construction Project was funded in 1991 by the U.S. Department of Education as a grantee through the National Workplace Literacy Program (PR #198A10155). The program provided basic skills instruction to industrial construction workers employed by companies which are members of the Pelican Chapter of Associated Builders and Contractors (ABC). Located in Baton Rouge, Louisiana, ABC provides training to employees of over 60 member companies who perform contract work in the 58 petrochemical facilities located along the Mississippi River between Baton Rouge and New Orleans.

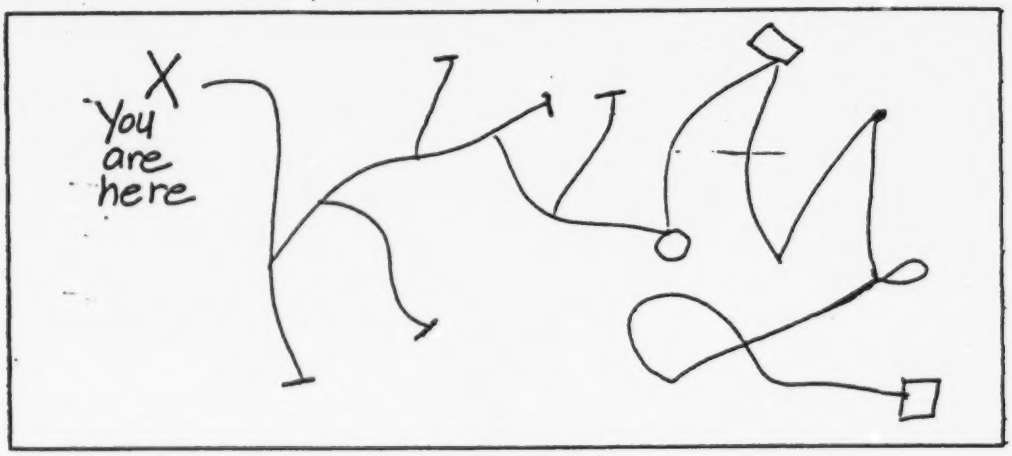
The grantee, the Adult Education Department of East Baton Rouge School Board, performed a comprehensive literacy task analysis of the apprenticeship training program for millwrights, pipefitters, electricians, instrumentation techs, and welders involved in the ABC training program. Over 20 modules of original, contextual curriculum were developed to teach the reading and math skills required for success in the craft training program.

Materials developed for instruction incorporated cognitive strategies for learning basic skills in the context of the craft and safety knowledge demanded by the industrial construction workplace. Instruction was written for a competency-based, open-entry/open-exit, individualized adult learning program that operated at the ABC training center in the evenings after work-hours.

By the end of this lesson, you will be able to define unknown words by examining the familiar words which surround them.

Objective

Instruction



✣ ✣ ✣

HURRY! X-MAS SALE!!! BIG BARGAINS!

✣ ✣ ✣

Hi, Regina!

Bobby asked me for a date. He said I really acted older that 16. I said I'd think about it. How's that for playing it cool?

xoxoxoxoxo
Juanita

✣ ✣ ✣

Consider the letter X. On a map, X shows a location. Coming before the letters *-mas*, it means Christmas. At the end of a young girl's note, x's stand for hugs (the o's equal kisses).

You recognize what the letter X means when you see its surroundings. The skills that let you find out what an X means helps you in finding what unknown words mean. This is true because words have surroundings, or contexts, too. These consist of the familiar words in the sentence. These words give clues to help you define new terms.

How does this happen? Suppose you decide to leave the job to eat lunch. You decide to go to Pizza Hut, Burger King, or Taco Bell. How do you choose where to eat? Your minds holds memories of each of these restaurants. You know that Pizza Hut serves pizzas and salads. It also has a 15-minute lunch special. You know that Burger King's menu includes hamburgers and other sandwiches. Your order here would take even less time than at Pizza

Hut. You know that Taco Bell sells Mexican foods. Service here is about the same as Burger King's.

You have memories of places to eat. And you have memories of words. The memories are related one to another. These inter-relationships grow all the time. One way you define unknown words is by using these connections. For example, consider the following sentence. It comes from the respiratory protection section of your text.

> **Wherever there is *DANGER* of *suffocation* or other *BREATHING HAZARDS*, the use of a *RESPIRATOR* is *REQUIRED*.**

While the text does not define *suffocation*, you can find its meaning. You do this by examining the words around it. The words breathing and respiratior tell you that suffocation concerns breathing. The words danger and hazards let you know that suffocation is something unsafe. The words respirator required lets you that this is how you avoid suffocation. You know a respirator helps you breathe. Thus, you figure out that *suffocation* means not breathing.

How can you use your memory connections to help you find meanings of unknown words? You first read the paragraph where the new term is found. As you do so, you ask "What is this paragraph about? What is this sentence about?" Answering these questions insures you're using the right memory connections. Then you look at the words which surround the unknown term. You try to find words that seem to be about the same subject. You'll find these words seem to "go" together. Next, you think about these clues and the subject of the paragraph. Then you create a meaning for the new word. With this meaning in mind, reread the sentence. If it makes sense, you have your definition. It may not the one you'd find in a dictionary. However, it's all you need for understanding. If your sentence doesn't make sense, you need to try again.

1 Sherry's husband says there's never been a worse time t be a construction worker. He wants her to quit the ABC program. He wants her to take a typing class. She plans to use the following information in her next talk with him. *Exercise*

> **In the 1920s, national employer and labor organizations, educators, and government officials began an effort to bring about a national apprenticeship system. The construction industry was a prime force in this movement. The need for comprehensive training of apprentices had become crucial in the boom days following World War I, when a *curtailment* of immigration slowed down the flow of skilled foreign workers.**

1. What does *curtailment* mean? How do you know?

_____

_____

_____

_____

2. Who are apprentices? Which words led you led you to this definition?

_____

_____

_____

_____

3. Why was their training so critical during this time?

_____

_____

_____

_____

2 Seb hates to wear gloves. He wonders why a pipefitter would need them. He finds this information in his ABC manual.

Many construction jobs require the use of heavy-duty gloves to prevent injury to the hands. Cloth, *canvas*, and leather are the most common materials used for gloves in construction.

Gloves are used to prevent cuts and scrapeswhen handling sharp or rough materials. Asbestosgloves are sometimes used for handling hot materials. Special rubber gloves are used by electricians when working on or around live circuits.

1. What is *canvas*? Which words led you to this definition?

_____

_____

_____

_____

2. From the information given in the second paragraph, what can you determine about the properties of asbestos?

_____

_____

_____

_____

3. Why do electricians working on or around live circuits wear special rubber gloves?

_____

_____

_____

_____

3 George needs to measure the thickness of a pipe wall. She plans to use a high-low gage to do so. Before starting, she reviews the following:

High-low mismatch gages differ by manufacturer, but all of them are basically the same. Every high-low gage has two *prongs*, or alignment stops, that are pulled tightly against the inside of the pipe until one stop is flush with each wall of the pipe or fitting. The variation between these two stops is read on a scale marked on the gage. The scale is usually *calibrated* in 32nds of an inch. Each gage will have a clearly marked zero point from which to read the variations.

1. What does variation mean? How do you know?

2. What are *prongs*? Why do you think so?

3. What does *calibrated* mean? Which words led you to this definition?

4. Why do you need a clearly marked zero point?

4 There have been five fires on job sites in Mark's hometown. Thus, his supervisor made copies of fire prevention procedures. She posted them all over Mark's job site.

Fire Prevention

1. **Remove all *combustible* material from the workplace before performing any flame-cutting operation.**
2. **Know the exact location of fire extinguishers and fire blankets.**
3. **Never open the valve of an acetylene cylinder near an open flame.**
4. **When finished with flame cutting equipment, shut off oxygen and acetylene valves and bleed the lines to the torch.**
5. **Adequate *ventilation* is necessary to prevent a concentration of oxygen and toxic fumes.**
6. **Oil and grease in the presence of oxygen will ignite and burn violently.**

1. What does *combustible* mean? How do you know?

_____

_____

_____

2. What might fire blankets be used for?

_____

_____

_____

3. What does *ventilation* mean? Which words tell you this?

_____

_____

_____

4. After reading all six procedures, explain why number 4 is important.

_____

_____

_____

5 Bill has owned a portable band saw for several years. He thinks that it was a great buy. It has performed well. Blades for it are a problem, however. They do not last. His friend Joe tells him that he needs to wax his blades. Bill thinks this is a waste of time. Joe plans to use the following information to prove his point.

Portable band saws have many applications. They are used to cut cable, reinforcing bars, soil pipe, stainless steel pipe, PVC pipe, copper and brass tubing, angle iron, flat stock, carbon steel pipe, and galvanized pipe. The blades should be waxed periodically with a special *lubricant* to prolong their life.

1. What does lubricant mean? How do you know?

_____

_____

_____

_____

2. Why would this increase the life of saw blades?

_____

_____

_____

_____

6 Pam's boss complains that no one ever cleans piping system properly. Pam has never understood why this is so important. After all, no one is going to see the pipes. Thus, she is very interested to learn her ABC text gives instructions on cleaning pipe systems.

> **All parts in a piping system must be cleaned and inspected before assembly. Dirt, sand, and other materials can clog strainers, *contaminate* fluids, and wear away parts. Use a clean rag soaked in solvent to clean the inside ends of the pipe, the flanges, and the gaskets.**

1. What does contaminate mean?

_____

_____

_____

_____

2. Describe the process you used to determine this meaning.

_____

_____

_____

_____

10

11

7 Roberto has always wondered how pipe is beveled. He ispleased to find information on this process in his text.

Beveling Pipe

The ends of carbon steel pipe require specialend preparation prior to fitting and welding. Each pipe and fitting is prepared with a specified bevel that must conform to the specifications for the given piping run.

Pipe may be beveled by hand using oxyacetylene equipment or in a number of ways by machine. Beveling machines may use *abrasive* saws, grinding wheels, or special saw blades to cut the bevel. Many beveling machines use oxyacetylene equipment.

All flame-cut surfaces must be smooth and free of slag. Edges are usually dressed with a sander/grinder.

1. What does abrasive mean? How do you know?

_____

_____

_____

_____

2. Why do flame-cut surfaces need to be smooth? By what process is this smoothness assured?

_____

_____

_____

_____

8 Seb hates gloves. His friend, Carl does not like to wear safety goggles. Their supervisor wants Carl to read the following:

Safety goggles with approved filter lenses must always be worn when flame cutting to protect the eyes from glare, heat, and flying particles of molten *slag*.

1. What is *slag*? How do you know?

_____

_____

_____

_____

2. In what ways do goggles protect your eyes while working?

_____

_____

_____

_____

12

13

9 Rosa hates to be confined to small places. Thus, she fears cave-ins. The information from her text doesn't comfort her. However, she now knows what to do to avoid cave-ins.

> **Danger of cave-in increases with the presence of water. Water at the bottom of a trench can create sticky *muck* that can trap the worker and make it impossible for him or her to avoid danger. Every effort must be made to keep the trench as dry as possible. A pump should be on hand on every open-cut job. It should have a hose long enough to reach below subgrade and a strainer on the foot valve to keep it from *plugging*.**

1. What does *muck* mean? Which words tell you this?

_____

_____

_____

_____

2. What does *plugging* mean? How do you know?

_____

_____

_____

_____

3. How does having a pump help stop cave-ins?

_____

_____

_____

_____

10 Norma has always wanted to drive a backhoe. She knows she will work with whoever is fitting pipe. She learns the importance of this that she has read her text.

Larger sizes of pipe may be pushed home with the backhoe bucket. This method requires close *coordination* between the pipelayer in the trench and the backhoe operator to prevent excessive pressure from being applied. Never allow the bucket to contact the bell of the mating pipe directly. Place a thick hardwood timber between the bucket and the bell end of the mating pipe.

1. What does *coordination* mean?

_____

_____

_____

_____

2. Describe the process by which you found this meaning.

_____

_____

_____

_____

14

15

11 Sammie needs to lift a concrete pipe. She doesn't have an eyebolt. She uses a 4" x 4" to push against the pipe. Her supervisors compliment her on the ways she "improvised". Sammie reads a description of lifting devices in her text. She is surprised that some are like the one she used. She is also surprised to see the same word used to discuss them.

> ***Job-improvised*** **lifting devices can also be used. A choker with an eye on the end is inserted into the lifting hole. A hard steel bar, a bullpoint from a jackhammer, or, in some cases, a long hardwood 4" x 4" timber is placed through the eye of the choker to bear against the pipe. Be sure these devices are strong enough to support the weight of the pipe.**

1. What does *improvised* mean? How do you know?

_____

_____

_____

_____

2. What does *job-improvised* mean? What workds tell you this?

_____

_____

_____

_____

3. What would happen if the job-improvised device was not strong enough to support the weight of the pipe?

_____

_____

_____

_____

Objective

By the end of this lesson, you will be able to define words using clues in the sentence provided by the author.

Instruction Have you ever wondered why H.& R.Block exists? Have you ever seen a television show on tax forms? Tax forms are prepared using a language special to them. If you are an accountant or a tax lawyer, these forms are easy. If not, you may find them hard to understand.

The same holds true for other subjects as well. Every subject has words that are special to it. These words comprise the specialized and technical vocabulary of a field. Authors know these words are confusing. So, they often include definitions when they use them. They do so in one of two ways.

First, sometimes they define a word in the sentence it is used in. For example, consider the following sentence.

> **"Forward" is clockwise and tightens;**
> **"Reverse" is counterclockwise and loosens.**

Forward and *reverse* are defined in the sentence. The verb *is* shows that a definition comes before or after it. Similarly, other verbs also signal definitions. These include *was*, *are*, *means*, *involves*, *refers to*, *includes*, *that is*, *is called*, and *resembles*. Words like these, tell you the author has provided a meaning. Suppose you see one of these verbs before or after a new word. You need to read carefully. What follows is probably the definition of a new word.

Second, authors often define new words by placing its meaning from the rest of the sentence. They use punctuation marks like parentheses (()), brackets ([]), dashes (--), and commas (,). For example, consider the following sentence.

> **This drawing is an *elevation*, or front, view**
> **of the system and shows the system height.**

What does *elevation* mean? It is the front. You know this because *front* follows elevation. It is also separated from the rest of the sentence by commas. Suppose you see sets of commas, brackets, parentheses, or dashes. Then, you read carefully. What follows may be a new term or a definition of a new term.

17 16

1 Norma thought pipefitting was a somewhat new field. She was surprised to read the following information.

During the *Middle Ages* (300 AD to about 1500 AD), there was the development of two large classes: merchants and skilled artisans. Both organized themselves into guilds, which attempted to control their respective fields in order to keep down competition and provide training for apprentices. The guilds established the indenture system. Sons of journeymen were indentured to a master who agreed to train the *apprentice* in the skills of the craft as well as to provide food, clothing, and shelter. The length of apprenticeship varied from two to ten years, depending on the trade.

1. What does *Middle Ages* mean? How do you know?

_____

_____

_____

_____

2. How are guilds different from and similar to what you know about unions?

_____

_____

_____

_____

3. What is an *apprentice*? Which words tell you this?

_____

_____

_____

_____

2 Walter needs to wear a safety belt on his next job. He wonders how long to leave the rope attached to the D-ring. He finds the following information helpful.

The *lanyard* (rope) should be long enough to allow you to work, but short enough to limit any fall to six feet. A safety belt should be used whenever you are working more than six feet above ground, near a large opening in a floor, or near a deep hole or protruding re-bar. The lanyard should be hooked over your head.

1. What is a *lanyard*? How do you know?

_____

_____

_____

_____

2. What can you infer about your chances of surviving a fall of less than six feet without serious injury? more than six feet?

_____

_____

_____

_____

18

19

3 Ken and Phil are brothers. They plan to share a respirator on the job site. Their boss insists they read the following:

Respirators used by only one person should be cleaned after each day of use or more often if necessary. Those used by more than one person should be cleaned and *disinfected* (made germ free) after each use.

1. What does *disinfected* mean? How do you know?

_____

_____

_____

_____

2. Why is it necessary that respirators be cleaned and disinfected?

_____

_____

_____

_____

4 Richard and Debbie are building a house. She wants to help him lay the pipe. The problem is that she knows little about tools. One day, she finds his manual. She reads about combination wrenches.

> ***Combination wrenches*** **are a cross between two types of wrenches, the open-end wrench and the box-end wrench.**
>
> **The box end of a combination wrench is circular and contains either 6 or 12 equally spaced notches, called "*points*." The box end completely surrounds the fastener, providing a good grip and making the box end suitable for work in close quarters. Generally, 12 points are preferred to 6 points because they make working in close quarters easier.**

1. What is a *combination wrench*? How do you know?

_____

_____

_____

_____

2. What are *points*? Which words tell you this?

_____

_____

_____

_____

21 20

5 Nathan's buddy tells him that he needs a plumb bob before setting pipe. Nathan decides to review this tool before purchasing it.

The Plumb Bob

As mentioned earlier, "*plumb*" describes a condition of exact verticality. It is this condition that a plumb bob measures.

Plumb bobs taper to a point. They are available in different weights, 6 oz., 8 oz., and 12 oz. being the most common. A cord is attached to them and then hung from a vertical member. If the distance from the top of the member to the point to which the cord is attached is equal to the distance from the bottom of the member to the point of the plumb bob, the member is said to "in plumb." If not, the member is "out of plumb" and this distance can be measured.

1. What does *plumb* mean? How do you know?

2. Why is it important to have pipes plumb?

3. List the steps in determining if a pipe is plumb.

6 Marty intends to cut some stainless steel pipe with his circular saw. He plans to purchase one. So, he decides to read what his text says about them.

The *circular saw* is a medium-duty electric power saw. Circular saws normally operate on 120 volts, but special models are available that operate on 240 volts.

The circular saw can be operated at only one speed. Typical "*no load*" (freewheeling) operating speeds for circular saws are about 5800 rpm.

1. What is a *circular saw*? How do you know?

_____

_____

_____

_____

2. What does "*no-load*" mean? How do you know?

_____

_____

_____

_____

22

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7 Belinda needs to read isometric drawings in class. She has studied text information concerning piping symbols.

Piping symbols **indicate the type of joint and fitting used in the system. Fittings made with flanged joints are shown by standard symbols.**

The first part of the number gives the pipe diameter in inches. The second part of the number indicates the fluid carried by the pipe, in abbreviations. Some common abbreviations are:

CW = Cold water **DP= Drain pipe**
HW = Hot water **S = Steam**

The third part is the pipe number. This number identifies a specific line within the piping system.

The last part of the line number is the *specifications book reference number*. This number tells which page in the specifications book contains further information about the system.

1. What do *piping symbols* show? Which words tell you this?

_____

_____

_____

_____

2. Identify the purpose for each of the following:

a. the first part of the number? _____

_____

b. the second part of the number? _____

_____

c. the third part of the number? _____

_____

d. the last part of the number? _____

_____

8 Maggie planned to buy a micrometer setting torque wrench for her dad for Christmas. She wants to know what one is before buying it. She finds his text. She reads the following information:

> **The micrometer setting torque wrench is commonly called the click or the breakaway torque wrench. When the proper torque is reached, the wrench makes a click and the handle releases, or "*breaks*," and moves freely for a short distance. This makes sure that the proper torque has been applied.**

1. What are *breaks*? How do you know?

_____

_____

_____

_____

2. Why is a micrometer setting torque wrench commonly called a click or breakaway torque wrench?

_____

_____

_____

_____

24

25

9 Wilbur needs to gauge the alignment of two pieces of pipe. He remembers learning about a high-low mismatch gage in class.

> ***High-low*** **refers to the alignment of one pipe or fitting in relation to the other. Ideally, there should be no misalignment between the internal diameters. The pieces should be as** ***concentric*** **as two coins placed one over the other. However, pipe often becomes egg-shaped due to storage and handling. Because of this, a certain amount of variation from the ideal high-low is tolerated. High-low can be measured with a high-low mismatch gage.**

1. What does *high-low* concern? How do you know?

_____

_____

_____

_____

2. What does *concentric* mean? Which words tell you this?

_____

_____

_____

_____

10 It's Jacob's first day on the job. He's helping one of the more experienced pipefitters. They are figuring lengths of straight pipe within the run. He quickly reviews information in his text about make-up.

> **Make-up (also called takeoff) is a term used frequently in the piping trades. It refers to the dimensions of the fittings within a run of pipe. No matter how pipe is joined or from what material pipe is made, the pipefitter will always need to know the make-up dimensions of the fittings within the system.**

1. What's another name for *make-up*? How do you know?

_____

_____

_____

_____

2. What does *make-up* mean? How do you know?

_____

_____

_____

_____

26

27

11 Manny has to handle some concrete pipe. He plans to use a rigging device to help him.

A commercial device, sometimes called a toggle, is available for handling concrete pipe. The toggle consists of a large-diameter wire rope with an eye at one end and a slug at the other. The diameter of the slug is larger than the diameter of the wire rope. The toggle is inserted into the hole of the pipe and secured by a bearing plate that usually has a long handle welded to it to make it easier to handle. No bolts are needed because the bearing plate is slotted and fits just over the slug and around the wire rope. When tension is applied, the slug presses against the bearing plate and the pipe is held secure until tension is released.

1. What is a *toggle*? Which words tell you this?

_____

_____

_____

_____

2. How would one acquire a toggle--construct it or buy it? How do you know?

_____

_____

_____

_____

3. Describe the process involved in using a toggle.

_____

_____

_____

_____

12 Geraldo and his friends are laying pipe for a road job. Their boss says they need to use horizontal elliptical pipe. Geraldo and his friends are laying pipe for a road job. Geraldo wonders why. He seeks information from his text.

Horizontal elliptical (HE) pipe is oval-shaped (elliptical) pipe that is installed with its span greater than its rise. It is used for minimum cover conditions and where vertical clearances may be limited by existing structures. Because HE pipe requires a wide trench for installation, it is subject to greater earth loads.

1. What does *elliptical* mean? Which words tell you this?

_____

_____

_____

_____

2. What is a *trench*? How do you know?

_____

_____

_____

_____

3. Other than in road construction, when might you use HE pipe?

_____

_____

_____

_____

28

29